Citation:

van Dam RM, Visscher AW, Feskens EJ, Verhoef P, Kromhout D. Dietary glycemic index in relation to metabolic risk factors and incidence of coronary heart disease: the Zutphen Elderly Study. *Eur J Clin Nutr.* 2000 Sep;54(9):726-31.

PubMed ID: 11002385

Study Design:

Prospective Cohort Study/Cross-sectional Analysis

Class:

B - Click here for explanation of classification scheme.

Research Design and Implementation Rating:

POSITIVE: See Research Design and Implementation Criteria Checklist below.

Research Purpose:

To examine whether a high dietary glycemic index is associated with hyperinsulinemia, hyperglycemia, dyslipidemia and coronary heart disease in elderly men.

Inclusion Criteria:

- Participants of the Zutphen Elderly Study
- Men aged 64 - 84 years in 1985

Exclusion Criteria:

- History of CHD or diabetes
- Missing information

Description of Study Protocol:

Recruitment

- The Zutphen Elderly Study is a longitudinal study of chronic disease risk factors in elderly male inhabitants of Zutphen, a town in the Eastern part of the Netherlands.
- It represents a continuation of the Zutphen Study, the Dutch contribution to the Seven Countries Study
- In 1985, 555 members of the original 1088 were still alive and invited for examinations
- In addition, a random sample of all other men of the same age, living in Zutphen, was selected, resulting in 1266 men born between 1900 and 1920 of which 939 (74%) took part in the survey and formed the cohort of the Zutphen Elderly Study

Design:

- Prospective cohort study of incidence of major CHD between 1985 and 1995 in 646 men
- Cross-sectional analysis of metabolic risk factors in 1990 in 394 men

Blinding used (if applicable): not applicable

Intervention (if applicable): not applicable

Statistical Analysis

- In cross-sectional analyses, metabolic risk factors were examined by quintile groups of the dietary glycemic index
- Means were adjusted for potential confounders using ANCOVA
- Association between the dietary glycemic index in 1985 and incidence of coronary heart between 1985 and 1995 disease was examined using Cox's proportional hazards (survival) analysis to calculate crude and adjusted risk ratios for men in the highest and intermediate tertile as compared with men in the lowest tertile of glycemic index

Data Collection Summary:

Timing of Measurements

- Prospective cohort study: 1985 - 1995
- Cross-sectional analysis: 1990
- Dietary and medical examinations were conducted in 1985 and 1990 between March and June

Dependent Variables

- Physical examinations carried out by trained physicians using standardized protocol
- Hyperinsulinemia, hyperglycemia and dyslipidemia assessed through standard laboratory methods
- Incidence of major coronary heart disease (non-fatal myocardial infarction or death due to coronary heart disease): information obtained by a physician-administered or self-administered standardized medical questionnaire, and information on vital status up to January 1995 was obtained from municipality registries or Dutch Central Bureau of Statistics

Independent Variables

- Dietary glycemic index was calculated
- Diet assessed with the cross-check dietary history method

Control Variables

- Age
- BMI
- Physical activity
- Cigarette smoking
- Total energy intake
- Intake of alcohol, saturated fat, polyunsaturated fat, and carbohydrate

Description of Actual Data Sample:

Initial N: 939 took part in the survey and formed the cohort

Attrition (final N): 646 men in the prospective cohort study, 394 in the cross-sectional analysis

Age: aged 64 - 84 years in 1985

Ethnicity: assumed Caucasian

Other relevant demographics:

Anthropometrics

Location: The Netherlands

Summary of Results:

Key Findings

- At baseline in 1985, median dietary glycemic index ranged from 77 in the lowest to 85 in this highest tertile of glycemic index
- Dietary glycemic index was positively correlated with consumption (in grams of carbohydrate) of wheat bread (r = 0.47) and sugar products (r = 0.41) and inversely with fruit (r = -0.37) and milk (r = -0.40) consumption
- During 4,527 person-years of follow-up, 94 cases of coronary heart disease were documented
- The risk ratio for CHD was 1.11 (95% confidence interval: 0.66 - 1.87) for the highest as compared to the lowest tertile of glycemic index after adjustment for age, BMI, physical activity, cigarette smoking and dietary factors (P for trend = 0.70).
- Glycemic index was not associated with blood concentrations of total cholesterol, HDL-cholesterol, triacylglycerols or (fasting or postload) insulin or glucose

Author Conclusion:

In conclusion, this study was the second prospective study that related the dietary glycemic index to coronary heart disease incidence. Our results do not support the hypothesis that the dietary glycemic index is associated with metabolic risk factors or incidence of coronary heart disease in elderly men without a history of diabetes or coronary heart disease. Current scientific evidence does not justify advice to lower the dietary glycemic index in an effort to reduce risk of coronary heart disease in persons without diabetes mellitus.

Reviewer Comments:

Recruitment methods not described for additional participants. Dietary intake only assessed at baseline in 1985. Authors note that data on the glycemic index of food products was not available for all foods consumed in present study.

Research Design and Implementation Criteria Checklist: Primary Research

Relevance Questions

1.	Would implementing the studied intervention or procedure (if found successful) result in improved outcomes for the patients/clients/population group? (Not Applicable for some epidemiological studies)	N/A
2.	Did the authors study an outcome (dependent variable) or topic that the patients/clients/population group would care about?	Yes
3.	Is the focus of the intervention or procedure (independent variable) or topic of study a common issue of concern to nutrition or dietetics practice?	Yes
4.	Is the intervention or procedure feasible? (NA for some epidemiological studies)	N/A

Validity Questions

1.	**Was the research question clearly stated?**	Yes
1.1.	Was (were) the specific intervention(s) or procedure(s) [independent variable(s)] identified?	Yes
1.2.	Was (were) the outcome(s) [dependent variable(s)] clearly indicated?	Yes
1.3.	Were the target population and setting specified?	Yes
2.	**Was the selection of study subjects/patients free from bias?**	Yes
2.1.	Were inclusion/exclusion criteria specified (e.g., risk, point in disease progression, diagnostic or prognosis criteria), and with sufficient detail and without omitting criteria critical to the study?	Yes
2.2.	Were criteria applied equally to all study groups?	Yes
2.3.	Were health, demographics, and other characteristics of subjects described?	Yes
2.4.	Were the subjects/patients a representative sample of the relevant population?	Yes
3.	**Were study groups comparable?**	Yes
3.1.	Was the method of assigning subjects/patients to groups described and unbiased? (Method of randomization identified if RCT)	Yes
3.2.	Were distribution of disease status, prognostic factors, and other factors (e.g., demographics) similar across study groups at baseline?	Yes
3.3.	Were concurrent controls used? (Concurrent preferred over historical controls.)	Yes
3.4.	If cohort study or cross-sectional study, were groups comparable on important confounding factors and/or were preexisting differences accounted for by using appropriate adjustments in statistical analysis?	Yes

3.5.	If case control or cross-sectional study, were potential confounding factors comparable for cases and controls? (If case series or trial with subjects serving as own control, this criterion is not applicable. Criterion may not be applicable in some cross-sectional studies.)	N/A
3.6.	If diagnostic test, was there an independent blind comparison with an appropriate reference standard (e.g., "gold standard")?	N/A
4.	**Was method of handling withdrawals described?**	Yes
4.1.	Were follow-up methods described and the same for all groups?	Yes
4.2.	Was the number, characteristics of withdrawals (i.e., dropouts, lost to follow up, attrition rate) and/or response rate (cross-sectional studies) described for each group? (Follow up goal for a strong study is 80%.)	Yes
4.3.	Were all enrolled subjects/patients (in the original sample) accounted for?	Yes
4.4.	Were reasons for withdrawals similar across groups?	Yes
4.5.	If diagnostic test, was decision to perform reference test not dependent on results of test under study?	N/A
5.	**Was blinding used to prevent introduction of bias?**	Yes
5.1.	In intervention study, were subjects, clinicians/practitioners, and investigators blinded to treatment group, as appropriate?	N/A
5.2.	Were data collectors blinded for outcomes assessment? (If outcome is measured using an objective test, such as a lab value, this criterion is assumed to be met.)	Yes
5.3.	In cohort study or cross-sectional study, were measurements of outcomes and risk factors blinded?	Yes
5.4.	In case control study, was case definition explicit and case ascertainment not influenced by exposure status?	N/A
5.5.	In diagnostic study, were test results blinded to patient history and other test results?	N/A
6.	**Were intervention/therapeutic regimens/exposure factor or procedure and any comparison(s) described in detail? Were interveningfactors described?**	Yes
6.1.	In RCT or other intervention trial, were protocols described for all regimens studied?	N/A
6.2.	In observational study, were interventions, study settings, and clinicians/provider described?	Yes
6.3.	Was the intensity and duration of the intervention or exposure factor sufficient to produce a meaningful effect?	Yes
6.4.	Was the amount of exposure and, if relevant, subject/patient compliance measured?	N/A

6.5.	Were co-interventions (e.g., ancillary treatments, other therapies) described?	N/A
6.6.	Were extra or unplanned treatments described?	N/A
6.7.	Was the information for 6.4, 6.5, and 6.6 assessed the same way for all groups?	N/A
6.8.	In diagnostic study, were details of test administration and replication sufficient?	N/A
7.	**Were outcomes clearly defined and the measurements valid and reliable?**	Yes
7.1.	Were primary and secondary endpoints described and relevant to the question?	Yes
7.2.	Were nutrition measures appropriate to question and outcomes of concern?	Yes
7.3.	Was the period of follow-up long enough for important outcome(s) to occur?	Yes
7.4.	Were the observations and measurements based on standard, valid, and reliable data collection instruments/tests/procedures?	Yes
7.5.	Was the measurement of effect at an appropriate level of precision?	Yes
7.6.	Were other factors accounted for (measured) that could affect outcomes?	Yes
7.7.	Were the measurements conducted consistently across groups?	Yes
8.	**Was the statistical analysis appropriate for the study design and type of outcome indicators?**	Yes
8.1.	Were statistical analyses adequately described and the results reported appropriately?	Yes
8.2.	Were correct statistical tests used and assumptions of test not violated?	Yes
8.3.	Were statistics reported with levels of significance and/or confidence intervals?	Yes
8.4.	Was "intent to treat" analysis of outcomes done (and as appropriate, was there an analysis of outcomes for those maximally exposed or a dose-response analysis)?	N/A
8.5.	Were adequate adjustments made for effects of confounding factors that might have affected the outcomes (e.g., multivariate analyses)?	Yes
8.6.	Was clinical significance as well as statistical significance reported?	Yes
8.7.	If negative findings, was a power calculation reported to address type 2 error?	N/A
9.	**Are conclusions supported by results with biases and limitations taken into consideration?**	Yes
9.1.	Is there a discussion of findings?	Yes

9.2.	Are biases and study limitations identified and discussed?	Yes
10.	**Is bias due to study's funding or sponsorship unlikely?**	Yes
10.1.	Were sources of funding and investigators' affiliations described?	Yes
10.2.	Was the study free from apparent conflict of interest?	Yes